

CLAIMS

What is claimed is:

- 1 1. In a computer system on which one or more applications execute, wherein a first  
2 application configuration is defined by first application configuration information,  
3 the first application configuration providing for execution of the application, a  
4 computer-implemented method for reconfiguring the application without  
5 restarting the computer system, comprising:  
6 reading second application configuration information defining a reconfigured  
7 version of the application;  
8 constructing a second application configuration based on the second application  
9 configuration information; and  
10 providing the second application configuration to an application runtime  
11 environment for servicing new requests related to the application while  
12 maintaining the first application configuration for servicing existing  
13 requests related to the application.
- 1 2. The method of claim 1, further comprising:  
2 destroying the first application configuration upon completion of all application  
3 service requests using the first application configuration, whereby  
4 computer system resources used to maintain the first application  
5 configuration are made available for other uses.
- 1 3. The method of claim 1, further comprising:  
2 accessing persistent session information related to an existing application user  
3 session to use for servicing new requests from the same user during the  
4 existing application user session.
- 1 4. The method of claim 1, further comprising:

- 2 determining that the second application configuration successfully initialized prior  
3 to providing the second application configuration to the runtime  
4 environment for servicing new requests.
- 1 5. The method of claim 4, wherein the step of determining that the second  
2 application configuration successfully initialized is based on a communication  
3 from the application runtime environment.
- 1 6. The method of claim 1, further comprising:  
2 receiving a request to reconfigure the computer system; and  
3 reconfiguring the computer system in response to the request.
- 1 7. The method of claim 1, wherein constructing the second application configuration  
2 is further based on an application runtime environment configuration.
- 1 8. The method of claim 7 wherein constructing the second application configuration  
2 includes:  
3 reading a timestamp associated with the second application configuration  
4 information; and  
5 determining that the second application configuration information is different than  
6 the first application configuration information based on the timestamp.
- 1 9. The method of claim 1 wherein constructing the second application configuration  
2 includes:  
3 reading a timestamp associated with a class file referenced in the second  
4 application configuration information;  
5 determining that the class file has changed based on the timestamp; and  
6 constructing the second application configuration, at least in part, according to the  
7 changed class file.
- 1 10. The method of claim 1, further comprising:

2 logging one or more messages related to providing the second application  
3 configuration to the computer system.

1 11. The method of claim 1, wherein providing the second application configuration  
2 comprises:

3 updating a current configuration reference to reference the second application  
4 configuration rather than the first application configuration.

1 12. The method of claim 11, wherein updating the current configuration reference is  
2 performed atomically.

1 13. The method of claim 1 wherein the first application configuration is maintained  
2 for servicing, without interruption, existing requests related to the application  
3 from an existing connection.

1 14. In a computer system on which one or more applications execute, wherein a  
2 former application configuration is defined by a first application configuration  
3 information and a current application configuration is defined by a second  
4 application configuration information, the application configurations providing for  
5 execution of the application, a computer-implemented method for processing  
6 application service requests, comprising:

7 completing processing a pending first request for an application service that is  
8 associated with the former application configuration;

9 receiving a second request for an application service;

10 associating the second request with the current application configuration;

11 accessing the second application configuration information defining the current  
12 application configuration; and

13 processing the second request according to the second application configuration  
14 information.

- 1    15. The method of claim 14 wherein the pending first request and the second request  
2       originate from the same user session, and wherein completing processing the  
3       pending first request and processing the second request are performed without  
4       restarting the computer system.
- 1    16. The method of claim 14, further comprising:  
2       determining whether the first application configuration information is referenced  
3       by at least one pending process; and  
4       deleting the first application configuration information from the computer system  
5       in response to determining that the first application configuration  
6       information is not referenced by at least one pending process.
- 1    17. The method of claim 16, wherein the first application configuration information  
2       occupies one or more blocks of memory, and wherein deleting the first application  
3       configuration comprises:  
4       releasing the one or more blocks of memory.
- 1    18. The method of claim 16, wherein determining whether the first application  
2       configuration information is referenced by at least one pending process comprises:  
3       determining whether a reference count is equal to a predetermined value  
4       indicating that no processes are referencing the first application  
5       configuration information.
- 1    19. In a computer system on which one or more applications execute, wherein a  
2       plurality of application configurations are defined by a plurality of associated  
3       application configuration information and one application configuration of the  
4       plurality of application configurations is the current configuration associated with  
5       a current version of a first application and two or more other application  
6       configurations of the plurality of application configurations are former

7 configurations associated with former versions of the first application, a  
8 computer-implemented method for processing application service requests,  
9 comprising:  
10 completing processing one or more pending requests for application services that  
11 are associated with any of the former configurations according to former  
12 configuration information that is associated with each of the one or more  
13 pending requests;  
14 upon receiving a new request for an application service, accessing current  
15 application configuration information defining the current configuration;  
16 and  
17 processing the new request according to the current application configuration  
18 information.

1 20. In a computer system on which one or more applications execute, wherein a  
2 current application configuration is defined by a first application configuration  
3 information, the current configuration providing for execution of the application, a  
4 computer-readable medium comprising instructions which, when executed by one  
5 or more processors, cause the one or more processors to reconfigure the  
6 application without restarting the computer system, by performing the steps of:  
7 reading second application configuration information defining a reconfigured  
8 version of the application;  
9 constructing a second application configuration based on the second application  
10 configuration information; and  
11 providing the second application configuration to an application runtime  
12 environment for servicing new requests related to the application from a  
13 new connection while maintaining the first application configuration for

14                   servicing existing requests related to the application from an existing  
15                   connection.

- 1       21. The computer readable medium of claim 20, wherein execution of the instructions  
2                  by the one or more processors causes the one or more processors to perform:  
3                  destroying the first application configuration upon completion of all application  
4                  service requests using the first application configuration, whereby  
5                  computer system resources used to maintain the first application  
6                  configuration are made available for other uses.
- 1       22. The computer readable medium of claim 20, wherein execution of the instructions  
2                  by the one or more processors causes the one or more processors to perform :  
3                  accessing persistent session information related to an existing application user  
4                  session to use for servicing new requests from the same user during the  
5                  existing application user session.
- 1       23. The computer readable medium of claim 20, wherein execution of the instructions  
2                  by the one or more processors causes the one or more processors to perform:  
3                  determining that the second application configuration successfully initialized prior  
4                  to providing the second application configuration to the runtime  
5                  environment for servicing new requests related to the application.
- 1       24. The computer readable medium of claim 23, wherein execution of the instructions  
2                  by the one or more processors causes the one or more processors to perform the  
3                  step of determining that the second application configuration successfully  
4                  initialized based on a communication from the application runtime environment.
- 1       25. The computer readable medium of claim 20, wherein execution of the instructions  
2                  by the one or more processors causes the one or more processors to perform:

- 3 receiving a request for reconfiguring the computer system absent any changes to  
4 the computer system configuration; and  
5 reconfiguring the computer system based on the second application configuration  
6 in response to the request.
- 1 26. The computer-readable medium of claim 20, wherein constructing a second  
2 application configuration is based on the second application configuration  
3 information and an application runtime environment configuration, and wherein  
4 execution of the instructions by the one or more processors causes the one or more  
5 processors to perform providing the second application configuration to the server  
6 for servicing new requests related to the application according to the second  
7 application configuration.
- 1 27. The computer-readable medium of claim 26 wherein execution of the instructions  
2 by the one or more processors causes the one or more processors to perform  
3 constructing the second application configuration by performing the steps of:  
4 reading a timestamp associated with the second application configuration  
5 information; and  
6 determining that the second application configuration information is different than  
7 the first application configuration information based on the timestamp.
- 1 28. The computer-readable medium of claim 20 wherein execution of the instructions  
2 by the one or more processors causes the one or more processors to perform  
3 constructing the second application configuration by performing the steps of:  
4 reading a timestamp associated with a class file referenced in the second  
5 application configuration information;  
6 determining that the class file has changed based on the timestamp; and  
7 constructing the second application configuration, at least in part, according to the  
8 changed class file.

- 1        29. The computer readable medium of claim 20, wherein execution of the instructions  
2                  by the one or more processors causes the one or more processors to perform :  
3                  logging one or more messages related to providing the second application  
4                  configuration to the computer system.
- 1        30. The computer-readable medium of claim 20 wherein execution of the instructions  
2                  by the one or more processors causes the one or more processors to perform  
3                  providing the second application configuration by performing the steps of:  
4                  updating a current configuration reference to reference the second application  
5                  configuration rather than the first application configuration.
- 1        31. The computer-readable medium of claim 30 wherein execution of the instructions  
2                  by the one or more processors causes the one or more processors to perform  
3                  updating the current configuration reference atomically.
- 1        32. In a computer system on which one or more applications execute, wherein a  
2                  former application configuration is defined by a first application configuration  
3                  information and a current application configuration is defined by a second  
4                  application configuration information, the application configurations providing for  
5                  execution of the application, a computer-readable medium comprising instructions  
6                  which, when executed by one or more processors, cause the one or more  
7                  processors to process application service requests, by performing the steps of:  
8                  completing processing a pending first request for an application service that is  
9                  associated with the former application configuration;  
10                 receiving a second request for an application service;  
11                 associating the second request with the current application configuration;  
12                 accessing the second application configuration information defining the current  
13                 application configuration; and

14 processing the second request according to the second application configuration  
15 information.

1 33. The computer-readable medium of claim 32 wherein the pending first request and  
2 the second request originate from the same user session, and wherein execution of  
3 the instructions by the one or more processors causes the one or more processors  
4 to perform completing processing the pending first request and processing the  
5 second request without having to restart the computer system.

1 34. The computer-readable medium of claim 32 wherein execution of the instructions  
2 by the one or more processors causes the one or more processors to perform the  
3 steps of:

4 determining whether the first application configuration information is referenced  
5 by at least one pending process; and  
6 deleting the first application configuration information from the computer system  
7 in response to determining that the first application configuration  
8 information is not referenced by at least one pending process.

1 35. The computer-readable medium of claim 34, wherein the first application  
2 configuration information occupies one or more blocks of memory, and wherein  
3 execution of the instructions by the one or more processors causes the one or more  
4 processors to perform deleting the first application configuration by performing :  
5 releasing the one or more blocks of memory.

1 36. The computer-readable medium of claim 34, wherein execution of the instructions  
2 by the one or more processors causes the one or more processors to perform  
3 determining whether the first application configuration information is referenced  
4 by at least one pending process by performing :

5 determining whether a reference count associated with the first application  
6 configuration information is equal to a predetermined value indicating that  
7 no processes are referencing the first application configuration  
8 information.

1 37. The computer readable medium of claim 36, wherein execution of the instructions  
2 by the one or more processors causes the one or more processors to perform  
3 determining that the second application configuration successfully initialized  
4 based on a communication from an application runtime environment.

1 38. An apparatus on which one or more applications execute, wherein a first  
2 application configuration is defined by first application configuration information,  
3 the first application configuration providing for execution of the application, the  
4 apparatus comprising:  
5 a network interface;  
6 a memory; and  
7 one or more processors connected to the network interface and the memory, the  
8 one or more processors configured for  
9 reading second application configuration information defining a reconfigured  
10 version of the application;  
11 constructing a second application configuration based on the second application  
12 configuration information; and  
13 providing the second application configuration to an application runtime  
14 environment for servicing new requests related to the application while  
15 maintaining the first application configuration for servicing existing  
16 requests related to the application.